



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/790,535 | 03/01/2004 | Michael B. Korzenski | ATMI-692 | 4252 |
| 24239 | 7590 | 11/16/2006 | EXAMINER | |
| MOORE & VAN ALLEN PLLC P.O. BOX 13706 Research Triangle Park, NC 27709 | | | DOUYON, LORNA M | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 1751 | |

DATE MAILED: 11/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/790,535

Applicant(s)

KORZENSKI ET AL.

Examiner

Lorna M. Douyon

Art Unit

1751

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 18, 20-41, 43 and 45-63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 18, 20-41, 43 and 45-56, 58-63 is/are rejected.
- 7) ☒ Claim(s) 57 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 1751

1. This action is responsive to the amendment filed on August 30, 2006.
2. Claims 1-16, 18, 20-41, 43, 45-63 are pending. Claims 60-63 are newly added claims.
3. The rejection of claim 12 and 38 under 35 U.S.C. 112, second paragraph is withdrawn in view of Applicants' amendment.
4. The rejection of claims 1-4, 7-10, 15, 20, 25-28, 30, 32-36, 40, 49-52 under 35 U.S.C. 102(b) as being anticipated by Mullee et al. (US Patent No. 6,500,605) is withdrawn in view of Applicants' amendment.
5. The rejection of claims 29, 56, 58 and 59 under 35 U.S.C. 103(a) as being unpatentable over Mullee '605 as applied to the above claims is withdrawn in view of Applicants' amendment.
6. The rejection of claims 5-6 and 31 under 35 U.S.C. 103(a) as being unpatentable over Mullee '605 as applied to the above claims, and further in view of Mullee (US Patent No. 6,306,564) is withdrawn in view of Applicants' amendment.
7. The rejection of claims 11, 13, 37 and 39 under 35 U.S.C. 103(a) as being unpatentable over Mullee '605 as applied to the above claims, and further in view of Douglas et al. (US Patent No. 5,868,862) is withdrawn in view of Applicants' amendment.

Art Unit: 1751

8. The rejection of claims 12, 14 and 38 under 35 U.S.C. 103(a) as being unpatentable over Mullee '605 as applied to the above claims, and further in view of Douglas, and further in view of Jureller et al. (US Patent No. 5,676,705) is withdrawn in view of Applicants' amendment.

9. The rejection of claims 1-13, 15, 20-21, 23-33, 35-40, 46, 48, 51-55 under 35 U.S.C. 103(a) as being unpatentable over Joyce et al. (US Patent No. 6,764,552) is withdrawn in view of Applicants' amendment.

10. The rejection of claims 1-13, 21-39, 46-55 under 35 U.S.C. 103(a) as being unpatentable over Korzenski et al. (US Patent No. 6,943,139) in view of Mullee '605 is withdrawn in view of Applicants' amendment.

Claim Objections

11. Claims 11, 12, 37, 38 and 50 are objected to because of the following informalities:

In claim 11, line 1, it is suggested that "further comprising" be replaced with "wherein the composition comprises" because claim 1, to which this claim depend upon, already recites the optional addition of surfactant.

In claims 12 and 38, it is suggested that the phrase "comprising at least one of the foregoing" in the last two lines of each claim be replaced with "thereof".

In claim 37, line 2, it is suggested that "further" be deleted because claim 25, to which this claim depends upon, already recites the optional addition of surfactant.

Art Unit: 1751

In claim 50, line 2, it is suggested that “soaking” be replaced with “soak”.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

12. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

13. Claims 1-16, 18, 20-41, 43, 45-54, 60-63 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The recital of “polymeric species” in each of the independent claims 1, 25 and 62 are nowhere supported in the specification and is therefore considered as new matter.

14. Claims 4, 30, 34, 45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 4 and 30, line 4 of each claim, the Markush language is improper. The phrase “the group consisting of” should be followed by “and” and not “or” See MPEP 2173.05(h)(I).

Claim 34 lacks support for “the silicon nitride particles” with respect to claim 31. This claim should depend from claim 32.

Claim 45 lacks support for “the polymeric alcohol” with respect to claim 25.

Claim Rejections - 35 USC § 102

15. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

16. **Claim 55 stands** rejected under 35 U.S.C. 102(e) as being anticipated by DeYoung et al. (US Patent No. 6,669,785), hereinafter “DeYoung”.

DeYoung teaches a fluid composition useful for cleaning a microelectronic substrate comprising from 0.0001, 0.0005 to 5, 10 or 20 percent by weight of an adduct of hydrogen fluoride and a Lewis base; and from 40 or 50 to 99.999 percent by weight of liquid or supercritical carbon dioxide, wherein the composition is aqueous or nonaqueous, and the composition may further comprise from 0.001 or 0.1 percent to 30 or 40 percent by weight of a cosolvent, and/or from 0.001 to 1, 3 or 5 percent by weight of a surfactant (see col. 2, lines 41-54). In a particularly preferred embodiment of the foregoing, the adduct is [pyridinium poly(hydrogen fluoride)], also known as hydrogen fluoride pyridine adduct or triethylamine trihydrofluoride (see col. 2, lines 37-40). The present invention will be carried out on a variety of substrates including but not limited to semiconductors such silicon wafers containing process residue (see col. 3, lines 36-39). DeYoung teaches the limitations of the instant claim. Hence, DeYoung anticipates the claim.

Claim Rejections - 35 USC § 103

17. Claims 56, 58-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mullee et al. (US Patent No. 6,500,605), hereinafter "Mullee '605" in view of Hayasaki et al. (US Patent No. 7,018,481), hereinafter "Hayasaki".

Mullee '605 teaches a method of removing photoresist and residue from a wafer following a medium dose ion implant wherein the method begins by maintaining supercritical carbon dioxide, a solvent and aqueous fluoride in contact with the wafer (see col. 4, lines 34-38; 62-64) and additional water (see col. 11, lines 25-34). The residue includes SiO₂ etch residue or SiN etch residue (see col. 3, lines 15-19). The pressure chamber was maintained at 70°C, the aqueous fluoride and solvent were circulated for 2 minutes at 1,250 psi after which the pressure chamber was pressurized to 2,800 psi, and two partial exhausts and one full exhaust were employed between the removal and rinse step (see col. 11, lines 25-49). Mullee '605, however, fails to disclose a pre-cleaning step comprising a SCF based pre-cleaning composition and an aqueous-based pre-cleaning composition comprising an oxidizing agent.

Hayasaki teaches, in an analogous art, a pretreatment method comprising an ozone water (see Table under col. 3). Hayashi also teaches a cleaning treatment comprising any cleaning solution such as a reducing solution, oxidizing solution (ozone water, oxygen water), weak alkali ion water, slightly acidic ion water, supercritical water, carbonated water, hydrogen water, and pure water, and combinations of these solution so that the cleaning effect is raised (see col. 26, lines 55-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to pretreat the wafers of Mullee '605 with the ozone water of Hayashi in combination with supercritical water because this would raise the cleaning effect as taught by Hayasaki.

18. Claims 62-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid et al. (US Patent No. 6,958,123), hereinafter "Reid".

Reid teaches a composition comprising a supercritical fluid, such as carbon dioxide, along with a cosolvent and dissolves a polymer and deposits the dissolved polymer on a substrate as a sacrificial layer (see col. 6, lines 13-17), wherein one selection of polymer is polyvinyls (see col. 6, line 34). Silicon nitride is also present in the substrate (see claim 26). Reid, however, fails to specifically disclose a composition wherein the polymer is polyvinyls.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected polyvinyls as the specific polymer in the composition of Reid because this is one useful selection of polymers taught by Reid.

Allowable Subject Matter

19. Claim 57 stands objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: None of the prior art of record, teaches, discloses or suggests a method as required in claim 57 wherein the pre-cleaning formulation comprises ammonium hydroxide, t-butyl hydrogen peroxide and water.

Art Unit: 1751

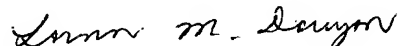
Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lorna M. Douyon whose telephone number is (571) 272-1313.

The examiner can normally be reached on Mondays-Fridays from 8:00AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas McGinty can be reached on (571) 272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Lorna M. Douyon
Primary Examiner
Art Unit 1751